AUTHORS: Gromov, K. Ya., Dzhelepov, B. S., SOV/48-22-7-2/24
Preobrazhenskiy, B. K.

TITLE: Conversion Electrons From Yb^{169} (Konversionnyye elektrony Yb^{169})

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol., 22, Nr 7, pp. 775-784 (USSR)

ABSTRACT: In this paper the spectrum of the conversion electrons of Yb^{169} obtained in a "thorough" (glubok) fission reaction from tantalum (Ref 5) was investigated. - On the basis of a comparison of the experimental data for the factors of internal conversion with theoretical values the following is stated:
1) The α_L-value for the 130,5 keV transition well agrees with the theoretical value for the transition of an E2 type.
2) The α_K-value obtained experimentally permits to maintain that the 118,2 keV transition is a pure E2 transition.
3) A comparison of the experimental and the theoretical value of α_L shows that the 63,1 keV transition is a pure E1 transition.
4) The experimental values of α_K and α_L of the 93,6 keV transition coincide best with the theoretical values for a transition of M1 type.

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5) The experimental values of the conversion factors in the 109,78 keV transition show an extremely good agreement with the theoretical values for a transition of the M1 type. The admixture of E2 apparently does not exceed 10 %.
6) No decision can be made between the M1 and E2 type in the 177 and 198 keV transitions with respect to the intensity of the lines of internal conversion at the K- and L-shells. Presumably it can be maintained that the admixture of E2 in these transitions is not below 20 %. The leading argument substantiating this assertion is the shape of the summary conversion lines at the L-shell (a conversion at the L_{III} sub-shell exists).
7) The value obtained experimentally for the factor of internal conversion at the K-shell for the 261,0 keV transition permits to establish the multipole order of the same - E1.
8) The assumption made by the author of the existence of the γ-transition at 309,2 keV could not be substantiated by γ-rays. Hence the intensity of γ-rays of 307,7 keV given in a paper by Du Mond (Dyumond) can be considered to represent the summary intensity of the γ-rays with an energy of 307,7 and 309,2 keV.

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3) The total intensities of the corresponding γ-transitions are given in a table. - The data obtained for the conversion electrons of Yb^{169} substantiate the decay scheme given in references 2 and 4. As an attachment the testing of the calibration of the apparatus for the measurement of the energy is described. There are 7 figures, 3 tables, and 9 references, 5 of which are Soviet.

ASSOCIATION: Radiyevyy institut imeni V. G. Khlopina Akademii nauk SSSR (Radium Institute imeni V. G. Khlopin AS USSR)

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SOV/48-22-7-5/26

AUTHORS: Dzhelepov, B. S., Preobrazhenskiy, B. K., Sergiyenko, V. A.

TITLE: Conversion Electron Coincidence in the Decay of $Tb^{155} \longrightarrow Gd^{155}$ (Sovpadeniya konversionnykh elektronov pri raspade $Tb^{155} \longrightarrow Gd^{155}$)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22, Nr 7, pp. 791-794 (USSR)

ABSTRACT: Tb^{155} was obtained by the irradiation of a tantalum target with protons of an energy of 660 MeV. The irradiation lasted for several hours. The chromatographic separation was carried out 20-30 hours after irradiation. The coincidence was investigated with the magnetic double-lens β-spectrometer of the State University Leningrad (Ref 1). The investigation was performed as follows. One half of the spectrometer recorded the K- and L-electrons from a certain γ-transition, whereas the other half recorded the K- and L-lines of the other transition. The experimental results compiled in a table show the following: 1) A coincidence of the L-63 and K-262 electrons. The line, which, pending final decision

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was denoted as L-63 consists of L-60,00, K-101 and K-105,32. It is possible, however, that also L-57 and L-63, which are generated in transitions, are contained in it. The total number of coincidences of (L-63) (K-262) amounted to 123 pulses per hour. 22 of those were random pulses and 101 were true ones. The existence of coincidences of L-63 and K-262 electrons is beyond doubt. The authors are of the opinion that these coincidences are essentially connected with the cascade of the γ-transitions with hν ~60 and 262 keV in the nucleus of Gd^{155}. 2) Coincidences of L-63 and K-(160 + 161 + 163) electrons. The existence of these coincidences cannot be doubted. The following combinations could take part in coincidences of this type: (L-60,0)(K-160,1), (L-60,00)(K-161,5), (K-101)(K-161,5), (K-105,32)(K-161,5) and (K-105,32)(K-160,4). The existence of these cascades is also substantiated by the complicated character of the spectrum of the coincidence of K-electrons originating from the (160 + 161 + 163)-transitions and from the electrons of the respective line. 3) Coincidence of the K-149- and K-(160+161+163)-electrons. The transitions with an energy of hν = 148,8

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Conversion Electron Coincidence in the Decay of Tb^{155} ---> Gd^{155} SOV/48-22-7-5/26

and 163,4 keV have hitherto not been inserted in the decay-scheme of Tb^{155} ---> Gd^{155}. The coincidences (K-149) [K-(160+161+163)] can be brought into connection with the cascade of the 148,4- and 163,4 keV transitions.
4) Coincidences of the K-(180+181,4)- and (L+M)-87, K-149, K-(160+161+163) electrons. The existence of coincidences of K-(180+181,4) and (L+M)-87 and of K-(180+181,4) and K-(160+161+163) is beyond doubt. That of K-(180+181,4) and K-149 can be assumed. There are 4 figures, 1 table, and 6 references, 4 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo gos. universiteta im. A. A. Zhdanova
(Scientific Research Institute of Physics at the Leningrad State University imeni A. A. Zhdanov)

Card 3/3

AUTHOR.: Dzhelepov, P. [illegible], [illegible], B. [illegible], Nergaard, T. [illegible]

TITLE: Coincidences of conversion electrons in the decay of Lu^{175}
(Sovpadeniya mezhdu konversionnymi elektronami pri raspade Lu^{175})
Precise determination of the decay of $Lu^{175} \rightarrow Yb^{175}$
(Utochnennaya skhema raspada $Lu^{175} \rightarrow Yb^{175}$)

PERIODICAL: Izvestiya Akademii nauk [illegible], Seriya Fizicheskaya, 1962, Vol. 26, Nr 7, pp. 779-807 (USSR)

ABSTRACT: Coincidences between some conversion transitions in Yb^{175} were found by means of a double-lens spectrometer (Ref 1). Yb^{175} is produced in the decay of Lu^{175} (T≈170 days). The evidence obtained permits a precise determination of the decay scheme of $Lu^{175} \rightarrow Yb^{175}$. In the first chapter the experimental results and a qualitative analysis are given. The Lu^{175} preparation was produced about one year after the lutetium fraction had been chromatographically separated from the tantalum target, which was irradiated with 660 MeV protons. Short-lived Lu-isotopes were lacking. Experimental results: 1) Coincidences (γb,γ)(b,γ) exist without doubt. In

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Coincidence of Conversion electrons in the Decay of Lu^{177}. Precise ...
termination of the Decay-scheme $Lu^{177} \longrightarrow Yb^{173}$

order to prove this, the composition of the lines K-100,7 +
+ K - LL must be known. This problem is the subject of
chapter 4. The proportion of intensities taken by the K-L
electrons is about twice as high as that of the K-LM line.
The proportion of K-100,7 is about 1/3 of the intensity of
the (K-100,7 - K-LL) lines. 3) The small number of coincidences
of (L-70,7),K-78,7) and(L-78,7),L-78,7) indicates the lack
of admixed K-100,7 + K-LL to the line L-78,7 and of admixed
K-2K to the line L-78,7. 4) The coincidences (K-[illegible],K-78,7)
are also established to exist. The transition [illegible] keV
is arranged in a cascade with the transition [illegible] keV.
5) The coincidences(K-77,[illegible] - 7,7) and (K-[illegible] are clearly distinguishable
apparently do not exist. 6) The coincidences (K-171,4)(K-78,7)
exist, they are, however, not numerous. The number of co-
incidences (K-171,4)(K-[illegible], however, is higher by
five times. In the second chapter the precisely determined
scheme of the decay of Lu^{177} is given. In this new scheme the
transition at 72,5 keV leads to the level at 78,7 keV.
Thus, a new level [illegible]-78,7-351,2 keV is introduced. The

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Coincidence of Conversion Electrons in the Decay of Lu^{173}. Precise De-termination of the Decay-Scheme $Lu^{173} \rightarrow Yb^{173}$

level of 351,2 keV is not in the rotation band of the ground state and apparently is a one-particle level.(In this range the vibration levels are higher). In the third chapter the quantal characteristics of the excited states of Yb^{173} are investigated. The type of the third level at E = 351,2 keV was still open to question. Evidence is furnished showing that it must be of a $7/2^+$-type. Even if deviations from theory of three orders of magnitude are assumed to exist, the uniqueness of the conclusions is not diminished. In chapter 4 the relative probabilities of the transitions in the decay of Lu^{173} are precised. The 5th section deals with an investigation of the relative intensity of capture at the different levels of Yb^{173}. It is shown that the quantal characteristics of the ground state of Lu^{173} coincide with that of the excited state of Yb^{173} at an energy of 351,2 keV. The transition between these two levels must be a permitted one. From parity considerations it appears that the transitions to all lower levels of Yb^{173}

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Coincidence of Conversion Electrons in the Decay of Lu^{173}. Precise Determination of the Decay-Scheme $Lu^{173} \longrightarrow Yb^{173}$

are forbidden. Among these, the transition to the 7/2⁻ level is the most probable one.

The quantitative analysis of the $e^- - e^-$ coincidences in the decay of $Lu^{173} \longrightarrow Yb^{173}$ is the subject of the 6th section. Based upon a comparison of the experimental and the computed coincidence rate the following is stated: 1) The experimental coincidence rate differs from the computed one by a factor of 7 - 9, if the K-78,7 line comes in in the measurements. This is probably due to the fact that the K-78,7 line, being the weakest one in the spectrum of conversion electrons, is not recorded by the coincidence counter. 2) For coincidences not connected with the K-78,7 line the experimental and the theoretical values agree within a limit of ± 25 % with each other. The second-year students of the State University/Leningrad, V. Bunakov and A. Myakusheva assisted in the coincidence measurements.

A. N. Murin, G. M. Gorodinskiy and V. N. Pokrovskiy communicated the results of the investigation of the γ-spectrum of Lu^{173} to the authors previous to the publication of their

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Coincidence of Conversion Electrons in the Decay of Lu^{175}. Precise Determination of the Decay-Scheme $Lu^{175} \longrightarrow Yb^{175}$

paper. There are 7 figures, 7 tables, and 19 references, 6 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo gos. universiteta im. A. A. Zhdanova
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SOV/48-22-7-11/26

AUTHORS: Gorodinskiy, G. M., Murin, A. N., Pokrovskiy, V. N., Preobrazhenskiy, B. K.

TITLE: On the Lutetium Isotope With the Mass Number 173 (Ob izotope lyutetsiya s massovym chislom 173)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22, Nr 7, pp. 818-820 (USSR)

ABSTRACT: A long-lived Lu-isotope with a half-life $T_{1/2}$ of about 200 days was discovered by the authors among the products of the rare earths obtained from a "thorough" (glubok) fission reaction. It was given the mass number 173. (Ref 1). As this half-life does not agree with that of reference 2 for Lu^{173} and as it is near to that of Lu^{174} (165 days) a separation of Lu from Hf was carried out. The lutetium separated from Hf was stored for several months until the short-lived isotopes had decayed almost completely. Then the β-spectra were investigated as well as the γ-spectra of the preparation obtained by a chromatographic separation of the sum of radioactive rare

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earths. When the necessity arose, the Lu preparations were purified from Yb^{169}. A comparison of the spectra shows that the basic proportion of the activity of long-lived Lu is without doubt caused by only one isotope with a half life of about 200 days. The table of isotopes from reference 2 shows that the only isotope remaining in the preparation separated from Hf is Lu. Thus, the earlier identification by the authors was substantiated. γ-lines with an energy of 345, 570 and 630 keV were discovered in the range of hard γ-radiation of the spectrum of Lu^{173}. It is only assumed that the 570 and 630 keV γ-lines originate from the Lu^{173} spectrum. The relative intensities of the γ-lines of Lu^{173} are determined by the following ratio: $\gamma_{79} : \gamma_{101} : \gamma_{175} : \gamma_{274} : \gamma_{345} : \gamma_{570} : \gamma_{630} =$ 1 : 0,52 : 0,425 : 1,85 : 0,0113 : 0,15 : 0,26. In order to check the coincidence of the γ-quanta of Lu^{173} the coincidences of the γ-quanta with an energy of 274, 175 and 79 keV with the other quanta of the spectrum were examined. The results are

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as follows: The γ-line at 79 keV gives a coincidence with the lines at 101, 175, and 274 keV. The γ-line at 175 keV gives a coincidence with the 101 keV-line and with that of the self-coincidence, which substantiates the composite character of this line. A control experiment checking on the coincidence of the 274 keV-line with the other lines confirmed these statements. Based upon a combined evaluation of the results from reference 3 and of this paper a decay scheme of Lu^{173} is suggested. The low activity of the preparation did not permit to determine the position of the 570 and 630 keV transitions. In the computation of the relative coincidence probability of various γ-quanta of Lu^{173} the aforementioned decay scheme and the known parameters of the measuring equipment for γ-γ-coincidences are used. The results of the computation and of the experiment well agree with each other. The staff of the Laboratory for Nuclear Problems OIYaI assisted in the work. K. Ya. Gromov and B. S. Dzhelepov discussed the results of the investigation with the authors. There are 4 figures and 3 references, 3 of which are Soviet.

On the Lutetium Isotope With the Mass Number 173

SOV/48-22-7-11/26

ASSOCIATION: Radiyevyy institut im. V. G. Khlopina Akademii nauk SSSR
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Card 4/4

AUTHORS: Antonʹyeva, N. M., Bashilov, A. A., Dzhelepov, B. S., Preobrazhenskiy, B. K. SOV/48-22-8-1/20

TITLE: The Spectrum of Conversion Electrons of Gd^{149} (Spektr konversionnykh elektronov Gd^{149})

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22, Nr 8, pp. 895-905 (USSR)

ABSTRACT: The radioactive Gd^{149} isotope was discovered by Hoff, Rasmussen and Thomson in 1951 (Ref 3), who observed the nuclear reactions of $Sm^{147}(\alpha,2n)Gd^{149}$ and $Eu^{151}(p, 3n)Gd^{149}$. In later years it was found (Ref 4) that Gd^{149} is transformed into Eu^{149} by electron capture (>99%) with a half life of 9 ± 1 days and into Sm^{145} ($\sim 10^{-3}$%) by alpha-particle emission with an energy of 3 MeV. The spectra of conversion of electrons and those of γ-rays had previously not been investigated. The basic experimental data were supplied by the authors at the 7th All-Union Conference of Nuclear Spectroscopy in January 1957. The present paper contains data concerning

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Gd^{149}, which were published in 1957 (Refs 6-8), as well as results of investigations carried out by the authors. The transition processes attributed by the authors to Gd^{149} are given in table 1. Conversion lines K-149,8 and L-149,8 are to be seen in figure 1 only. The lines between the intervals 220-360 and 400-550 keV are also shown in figures 3 and 4. They concern a later moment at which the short-lived Gd^{147} isotope ($T_{1/2}$ = 35 hours) had already decayed. Long-lived Gd^{151} and Gd^{153} isotopes in these intervals result in lines K-243, K-306, K-350 etc., which show low intensity in the case of short irradiation and can not be distinguished at such a scale as in figure 3. The values K:L mentioned in table 1 are, according to available data, the arithmetical mean of about 10 series of measurements. Burin et al. (Refs 6 and 7) state that by means of the scintillation counter they observed γ-rays of Gd^{149} with the following energies: E_γ = 150, 400, 347 and 520 kev. Recently the paper by Rasmussen and his collaborators has been published (Ref 8) by which the

radiation of Gd^{149} was investigated. For reasons of comparison data are given of that paper for powerful conversion lines in table 1. The two results agree well (up to 119,8 keV). In addition, some faint lines were attributed to the Gd^{149} isotope in the paper mentioned. The identification of these lines, however, is not quite reliable. The data obtained from the spectrum of the conversion electrons of Gd^{149} permit some conclusions concerning the types (multipole order) of the nuclear transition in Eu^{149}. For this reason the results of measurements (table 2) are compared with the computed ones. The scheme of the decay of $Gd^{149} \longrightarrow Eu^{149}$ suggested here is shown by figure 5. The energy of decay is computed by Levi on the basis of the empirical formula for atomic masses, see reference 11. In view of the fact that the nuclei $_{64}Gd^{149}_{85}$ and $_{63}Eu^{149}_{86}$ have less than 88 neutrons, it must be concluded that they belong to the category of the spherical ones as described by Mayer's model.

The authors thank the head of the laboratory for nuclear problems OIYaI V.P. Dzhelepov and the staff of the synchrocyclotron and they also express their gratitude to A.N. Murin, G.M. Gorodinskiy, V.N. Pokrovskiy, V.A. Sergiyenko, L.A. Sliv and I.M. Band.

There are 5 figures, 2 tables, and 11 references, 7 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo gos. universiteta im. A.A. Zhdanova (Scientific Research Institute of Physics, Leningrad State University imeni A. A. Zhdanov)

SOV/48-22-8-2/20

AUTHORS: Anton'yeva, N. M., Bashilov, A. A., Dzhelepov, B. S., Preobrazhenskiy B. K.

TITLE: Conversion Electron Spectra of Gd^{147} and Eu^{147} (Spektry konversionnykh elektronov Gd^{147} i Eu^{147})

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22, Nr 8, pp. 906 - 918 (USSR)

ABSTRACT: This is a study of the spectra of the conversion electrons of Gd^{147} and of its decay product Eu^{147} under the same experimental conditions as in the study of Gd^{149} (Ref 1). The basic experimental results were communicated at the 7th All Union Conference of Nuclear Spectroscopy in January 1957 (Ref 2). First the summary spectrum of the gadolinium fraction was investigated, this spectrum is comprising lines from several isotopes. It can be concluded, that the Gd isotope with a half-life of $T_{1/2} = 35 \pm 1$ hours transmutates into a radioactive Eu isotope. This by means of an electron capture with a half life of $T_{1/2} = 25 \pm 1$ days again transmutates into Sm entrailing nuclear transitions with energies of 120 and 200 keV. Control experiments were conducted

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with europium separated chromatographically from gadolinium. According to informations available in publications (Ref 5) the activity of europium with a half life of 24 days which is accompanied by a γ-radiation with 120 and 200 keV originates from the isotope Eu^{147}. Hence the Gd isotope decaying with a half-life of 35 ± 1 hours is considered to be Gd^{147}. The overall spectrum of the conversion electrons of the gadolinium fraction in the energy range below 500 keV is presented in the previous paper (Ref 1, Fig 1). In this paper a section of the spectrum below 400 keV is presented with the exclusion of the other isotopes of Gd and Eu (Fig 3). The section of the spectrum between ∼ 400 keV and ∼ 1,5 MeV is given in figure 4. The evidence collected and some supplementary data permit to draw conclusions concerning the multipole order of the transitions to the ground state in Eu^{147}. Experimental values of K/L, α and of other quantities are compared with theoretical values in table 2. Energy relations between the transitions and a rough estimation of their intensities suggest a decay scheme as given in figure 5. The total picture of the Eu^{147} conversion electron spectrum is given in figure 7. The decay scheme $Eu^{147} \rightarrow Sm^{147}$ was

recently subjected to a closer investigation (Ref 9), by which this scheme was supplemented by the transitions 76,5, 600, 676 and 800 keV (Fig 8). The decay energy was computed on the basis of the empiric formula for atomic masses by Levy (Ref 8). The intensity data on nuclear transitions permit to compute approximately the relative probabilities of electron capture in Eu^{147} leading to different levels of Sm^{147}. In order to determine the probability of the capture leading to the normal state of Sm^{147} it would be necessary to know the total number of Auger (Azhe) electrons. As the authors, however, had no preparations of pure Eu^{147} at their disposal, the values used in the computation of the relative probabilities of the decay of Eu^{147} to different levels were taken from reference 9. The authors express their gratitude to the Director of the Laboratory of Nuclear Problems OIYaI V.P.Dzhelepov and to the synchrocyclotron staff as well as to A.N.Murin, G.M.Gorodinskiy, V.N.Pokrovskiy, V.A.Sergiyenko and L.A.Sliv and I.M.Band. There are 8 figures, 4 tables, and 12 references, 9 of which are Soviet.

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Conversion Electron of Gd^{147} and Eu^{147}

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo gos.universiteta im.A.A.Zhdanova (Scientific Research Institute of Physics at the Leningrad State University imeni A.A.Zhdanov)

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SOV/48-22-8-3/20

AUTHORS: Adamchuk, V. K., Bashilov, A. A., Preobrazhenskiy, B. K.

TITLE: Internal Conversion Coefficients of Some Nuclear Transitions in Eu^{147} and Eu^{149} (Koeffitsiyenty vnutrenney konversii nekotorykh yadernykh perekhodov v Eu^{147} i Eu^{149})

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22, Nr 8, pp. 919 - 926 (USSR)

ABSTRACT: The method used in this paper of the determination of the internal conversion coefficients requires no information concerning the decay scheme. It is based upon measurements by means of a magnetic spectrometer of the number of conversion electrons and of γ-photons (produced by photo-electrons) which are emitted by a source. Similar experiments were carried out by Karamyan and Prokof'yev (Ref 4). In the spectrum of the conversion electrons of Gd^{147} extremely intensive lines corresponding to the transitions 229, 370 and 396 keV in Eu^{147} were observed. The relative intensities of other transitions are considerably smaller. All measurements and the calibration were carried out under the same standard

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conditions. The conversion electron lines of the nuclear transitions to the ground state in Eu^{147} and Eu^{149} (radioactive Gd^{147}- and Gd^{149} isotopes) are shown in figure 3. The counting rate is given in relative units. The coefficients of the internal conversion are compared with the theoretical values of transitions of different types (Table 2). The last column shows what conclusions are to be drawn with respect to the multipole order of the investigated transitions. Another finding of this paper is represented by the data concerning the relative intensities of the γ-radiation of Gd^{147} and Gd^{149}. The results achieved by the authors are compared to those obtained by Rasmussen and his collaborators (Ref 1)(Table 3). As it can be seen the given data noticeably diverge in the case of Gd^{149}, the difference exceeding the limits of an experimental error. This can, on the one hand, be explained by the insufficient consideration of photoelectron absorption in the radiator in the case of soft γ-rays E_γ = 150 keV. On the other hand it is apparently dependent on the low resolution of the scintillation counter employed by Rasmussen. When the multipole order of the

Internal Conversion Coefficients of Some Nuclear Transitions in Eu^{147} and Eu^{149}

transitions to the ground state in Eu^{147} and Eu^{149} is known the compilation of block diagrams is possible. A comparison of the relative intensity of the ground transitions and of the multipole order leads to the following natural assumptions: the most intensive transition of the type M1 with energies of 229 and 150 keV and the transitions of the type M2 with energies of 396 and 346 keV, proceed in a cascade and the decay schemes are arranged as in figure 5. It must be underlined that this interpretation of the lower levels of Eu^{147} and Eu^{149} is closely connected with the multipole orders and with the intensities of the transitions which were found in this paper, as according to the model by Mayer other characteristics of the levels are possible. The level schemes given as an example illustrate the character of the modification at the transformation from spherical to oblong nuclei. The authors expressed their gratitude to the Director of the Laboratory of Nuclear Problems OIYaI V.P.Dzhelepov and to the synchrocyclotron staff. There are 6 figures, 3 tables, and 15 references, 10 of which are Soviet.

Internal Conversion Coefficients of Some Nuclear Transitions in Eu^{147} and Eu^{149} SOV/48-22-8-3/20

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo gos.universiteta im.A.A.Zhdanova (Scientific Research Institute of Physics at the Leningrad State University imeni A.A.Zhdanov)

Card 4/4

AUTHORS: Dzhelepov, B. S., Preobrazhenskiy, B. K., SOV/48-22-8-5/20
Rogachev, I. M., Tishkin, P. A.

TITLE: Conversion Electron Spectrum of the Cerium Fraction (Spektr konversionnykh elektronov tseriyevoy fraktsii)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22, Nr 8, pp. 931 - 934 (USSR)

ABSTRACT: The activity of the cerium fraction in all sources obtained by the authors by irradiation at different times was small. At the beginning of the measurements the counting rate of the most intensive conversion line was 900 pulses per minute. The spectrum of the conversion electrons is shown in figures 1 and 2. Table 1 gives the energies of the lines, their possible identification and their relative intensities. The 15 electron lines that are found are classified into 3 groups according to their half-life. The intensities of the electron lines with energies of 126,2 and 159,1 keV decreased very slowly. These lines are apparently produced by the K- and (L + M) conversion electrons of the well known γ-transition hν=165 keV of the Ce^{139} isotope ($T_{1/2}$ = 140 days). The

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intensity of the electron lines 212,8 and 248 keV decreased with a half-life of 33 hours. These lines can be identified as K- and (L + M) conversion lines of γ transition. The value of the ratio K/(L + M) indicates a multipole type E3 (Table 2). An isomeric state with an energy of 256 keV corresponding to a half-life of 34,5 hours (Ref 7) exists in the isotope Ce^{137}. The authors are of opinion that considering the comparability of the decay energy (half-life energy) and of the multipole order energy of the observed transition with the data of the isomeric transition in Ce^{137} the activity with a half-life of 33 hours could be ascribed to Ce^{137}. These data do not contradict the decay scheme suggested by Brosi and Kerbelis. The intensity of the remaining lines decreased with a half-life of 17 hours. The evidence obtained by the authors is not sufficient to ascribe the lines with a $T_{1/2}$ of 17 hours to one definite Ce-isotope or to one of its daughter products, or to set up decay schemes. The authors express their gratitude to the synchrocyclotron staff and to I.A.Yutlandov. There are 2 figures, 2 tables, and 8 references, 4 of which are Soviet.

Conversion Electron Spectrum of the Cerium Fraction SOV/48-22-8-5/20

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy Institut Leningradskogo gos. universiteta im. A.A.Zhdanova (Scientific Research Institute of Physics at the Leningrad State University imeni A.A.Zhdanov)

Card 3/3

AUTHORS: Dzhepelov, B. S., Preobrazhenskiy, B. K., SOV/48-22-8-8/20
Sergiyenko, V. A.

TITLE: Conversion Electron Coincidences in the Decay $Eu^{147} \rightarrow Sm^{147}$ (Sovpadeniya konversionnykh elektronov pri raspade $Eu^{147} \rightarrow Sm^{147}$)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22, Nr 8, pp. 945 - 948 (USSR)

ABSTRACT: The authors employed a double lens β-spectrometer (Ref 1) in the investigation of the coincidences between the conversion electrons produced in the decay $Eu^{147} \rightarrow Sm^{147}$ ($T_{1/2} \sim 25$ days). $Eu^{147} \rightarrow Sm^{147}$ γ-transitions with energies of 121,0 and 197,6 keV (Refs 2 - 4) were found in the $Eu^{147} \rightarrow Sm^{147}$ - decay. The transition with an energy of 80 keV which was found in the paper given by reference 3 and in the experiments could not be observed in this investigation. However, conversion lines with 76,3 keV were found (Ref 2). The spectrum of conversion electrons up to an electron energy of 200 keV was taken with one half on the spectrometer. The source was directed with its active side towards the spectrometer.

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(Fig 1). The number of conversion lines, their position within the spectrum and their relative intensities agreed with the data presented by Gorodinskiy et al. (Ref 3). Because of an insufficient resolving power of the spectrometers the K and the (L + M) lines of the transition 76,3 keV did not stand out clearly. The L-line could not be recorded separately from the K-LL line of the Auger (Azhe) electrons and the (L + M) line could not be distinguished from the K-121,0 line. Coincidences were observed between the K-121,0 and K-197,6, the (L + M)-197,6 and (L + M)-121,0 electrons with the K-Auger electrons as well as the coincidences of the K-121,0 electrons through the slit in order to determine the (L + M) lines of the 76,3 keV transition. Besides, coincidences between the K-121,0 and the K-Auger electrons were recorded. The number of true coincidences varied between 3,5 and 179 pulses per $minute^{-1}$. The ratio of true and random coincidences was 9 : 1. The experimental results are compiled in a table and described (Figs 2,3). The data collected agree with the decay scheme of Eu^{147} (Ref 5). The authors acknowledge the

interest shown by A.A.Bashilov. V.Bunakov and Yu.Zvol'skiy assisted in the measurements. There are 3 figures, 1 table, and 5 references, 5 of which are Soviet.

ASSOCIATION: Nauchno-issledovatelskiy fizicheskiy institut Leningradskogo gos.universiteta im.A.A.Zhdanova (Scientific Research Institute of Physics at the Leningrad State University imeni A.A.Zhdanov)

PREOBRAZHENSKIY, B.K.; KALYAMIN, A.V.; MIKHALCHA, I.

Isolation of gold and thallium from a complex mixture of elements by partition chromatography. Radiokhimiia 6 no. 1:1111-112 '64. (MIRA 17:6)

PREOBRAZHENSKIY, B.K.; LILOVA, O.M.

Some properties of sulfostyrene cation exchangers and their performance in a neutral and weak acid region. Radiokhimiia 6 no. 1:128-130 '64. (MIRA 17:6)

AUTHORS: Dzhelepov, B. S., Preobrazhenskiy, B. K., SOV/48-22-8-9/20
Sergiyenko, V. A.

TITLE: Conversion Electron Coincidences in the Decay $Tu^{167} \rightarrow Er^{167}$ (Sovpadeniya konversionnykh elektronov pri raspade $Tu^{167} \rightarrow Er^{167}$)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22 , Nr 8, pp. 949 - 951 (USSR)

ABSTRACT: The authors investigated the conversion electron coincidences between the conversion transitions of the decay $Tu^{167} \rightarrow Er^{167}$ ($T_{1/2} \sim$ 9,6 days) with a β-double spectrometer (Ref 1). Tu^{167} was obtained by bombarding a tantalum target with 600 keV protons. The neutron deficient Tu-isotopes were separated from the rare earth fractions in a chromatographic column. In the decay $Tu^{167} \rightarrow Er^{167}$ transitions with the following energies take place (Ref 2-4): 56,9 and 208,1 keV (average values according to references 2 and 4). The spectrum of the conversion electrons of Tu^{167} in the range to about 200 keV was taken by one half of the spectrometer (Fig 1). The position of the lines and their relative intensities agree

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Conversion Electron Coincidences in the Decay $Tu^{167} \rightarrow Er^{167}$ SOV/48-22-8-9/20

with the spectrum given in reference 2. The coincidences between the conversion electrons of the transitions with hν = 96,9 and 208,1 keV and between those electrons and the Auger electrons from the K-series were examined by the authors. The results are compiled in the table and explained (Fig 2). The decay scheme $Tu^{167} \rightarrow Er^{167}$ which was advocated in the references 2 and 3 (Fig 1) is substantiated by the experimental results. The authors express their gratitude to K.Ya.Gromov and to the students of the Leningrad State University, V.Bunakov and L.Popenko. There are 2 figures, 1 table, and 12 references, 6 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo gos.universiteta im.A.A.Zhdanova (Scientific Research Institute of Physics of the Leningrad State University imeni A.A.Zhdanov)

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SOV/48-22-8-9/20

Conversion Electron Coincidences in the Decay $Tu^{167} \rightarrow Er^{167}$

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21(8) SOV/56-35-5-51/56

AUTHORS: Kel'man, V. M., Metskhvarishvili, R. Ya., Preobrazhenskiy, B.K., Romanov, V. A., Tuchkevich, V. V.

TITLE: The Investigation of the Spectrum of Conversion Electrons of the Isotopes of Lutetium With Neutron Deficit (Issledovaniye spektra konversionnykh elektronov neytronodefitsitnykh izotopov lyutetsiya)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 5, pp 1309-1310 (USSR)

ABSTRACT: The investigation of the radiation of greatly deformed nuclei furnishes material for the further development of the collective nuclear model. It is just from this point of view that the isotopes of lutetium are of interest. Recently several papers (Refs 1-4) have been published which deal with lutetium isotopes with neutron deficit, but the data given by these papers do not convey a clear idea of the decay of these isotopes. Additional investigations are therefore necessary. The authors of the present paper investigated the conversion spectrum of the isotopes of a lutetium fraction, which had been separated from a tantalum target irradiated with fast (660 MeV) protons. The method employed for separation has already been

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The Investigation of the Spectrum of Conversion Electrons of the Isotopes of Lutetium With Neutron Deficit

described (Ref 5). Measurements were carried out by means of a prism-β-spectrometer and by means of a double-focusing spectrometer. The spectrum of the conversion electrons consists of many lines, which belong to Lu^{169} (half-life ~1.5 days), Lu^{170} (~ 2 days), Lu^{171} (~8 days), Lu^{172} (~ 6.7 days), Lu^{173} (~200 days). Belonging of lines to the various corresponding isotopes was determined from the half-life. A table gives the energies of γ-transitions the conversion lines of which decrease with the period ~1.5 to 2 days. The second table contains the energies of the γ-transitions with the period 6.7 to 8 days. The energy of these transitions was determined from the energy of K- and L-conversion lines. There are 2 tables and 6 references, 4 of which are Soviet.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut Akademii nauk SSSR(Leningrad Physico-Technical Institute of the Academy of Sciences, USSR)

AUTHORS: Anton'yeva, M. N., Bashilov, A. A., Dzhelepov, B. S., Corresponding Member of the AS USSR, Preobrazhenskiy, B. K. 20-119-2-12/60

TITLE: Conversion Spectra of Some Neutron-Deficient Terbium Isotopes (Konversionnyye spektry nekotorykh neytronodefitsitnykh izotopov Tb)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol 119, Nr 2, pp 241-243 (USSR)

ABSTRACT: The present paper investigates the conversion spectra of the neutron-deficient Tb-isotopes resulting in the reaction Ta + P (660 MeV). The preparations and the conditions of experiments are similar to those in 2 previous works (references 1, 2). The decay curves determined from the change of the conversion peaks with progressing time showed that the Tb-preparation contains several isotopes. The present paper gives the results obtained for each of the observed activities: 1) $T_{1/2} = 8 \pm 1$ hours.

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Only the conversion electrons of the two transitions E_γ =123 and 977 keV were observed. One of the isomers of Tb^{154} shows $T_{1/2}$ =7,5 hours. Furthermore the level 123 keV is known for Gd^{154}. Therefore the given activity was attributed to Tb^{154}. The other transitions known from the decay of Eu^{154} were, however, not observed in Gd^{154}. 2) $T_{1/2}$ = 18 $\pm$ 1 hours. Within the energy interval of from 109 to1050 keV 16 nuclear transitions as well as a composed β^+-spectrum with E_{limit} = 2,8 MeV were observed. The values of E_γ of the here discussed transitions differ from the corresponding values known from the decay of Eu^{154}. The 18-hour activity observed here can be attributed to Tb^{154} or to Tb^{151} partly or completely.

3) $T_{1/2}$ = 2,3 ± 0,3 days. Within the interval of about 100 to 250 keV 8 nuclear transitions were observed. Until now no isotopes have been known which decay with such a half life. The newly discovered activity obviously belongs to Tb^{153}. The authors observed in fact Gd^{153} in the secondary products of its preparation.
4) $T_{1/2}$ = 5 ÷ 1 days. The transitions attributed to the half life of 5 days obviously belong to the isotopes Tb^{155} and Tb^{156}. The authors attribute 14 transitions to Tb^{155}, with respect to their energy they partly correspond to the 19 known transitions. The transition with E_γ = 89 and 199 keV were attributed to Tb^{156}. 5) $T_{1/2}$ = 10; 120 or 200 days respectively. The activities with these half lives also belong to the secondary products of Gd^{149}, Gd^{151} and Gd^{153}. The authors express their thanks to the Team

Conversion Spectra of Some Neutron-Deficient Terbium Isotopes 20-119-2-12/60

of the Synchrocyclotron of the United Institute for Nuclear Research (Ob"yedinennyy institut yadernykh issledovaniy) for the irradiation of the tantalum samples; they also thank L. Soyenko and E. Pania for their collaboration in the measurements. There are 2 figures, 2 tables, and 8 references, 2 of which are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova (Leningrad State University imeni A. A. Zhdanov)

SUBMITTED: December 25, 1957

Card 4/4

PREOBRAZHENSKIY, B.K., kand.khimicheskikh nauk

Use of ion exhcanges chromatography for the separation of transuranium and radioactive rare earth elements. Khim.nauka i prom. 4 no.4:521-526 '59. (MIRA 13:8)
(Rare earths) (Radioactive substances) (Ion exchange)

SOV/48-23-2-6/20

21(7)
AUTHORS: Anton'yeva, N. A., Bashilov, A. A., Dzhelepov, B. S., Il'in, V. V., Preobrazhenskiy, B. K.

TITLE: Conversion Electrons of Eu^{149} (Konversionnyye elektrony Eu^{149})

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1959, Vol 23, Nr 2, pp 204-205 (USSR)

ABSTRACT: In investigating the electron spectra of Eu and Gd fractions the authors determined some lines with equal energy among the conversion lines of both fractions. The energy difference of the K - L and K - M lines indicates that the corresponding nuclear transitions take place in the samarium nucleus. The respective energies amount to 256, 279 and 330 kev. From the half-life periods determined by the lines K-279 and K-330 the authors concluded that they had found a long-lived Eu isotope which decays to the samarium nucleus. According to a comparison with data published on Eu isotopes also Eu^{149} is considered to be responsible for the above-mentioned phenomenon. The authors concluded that the transitions with the energies 256-330 kev belong to the types E2 or M1, yet no definite conclusion can be drawn from the results obtained.

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Conversion Electrons of Eu^{149} 307/48-23-2-6/20

There are 2 figures, 2 tables and 3 Soviet references.

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo gos. universiteta im. A. A. Zhdanova
(Scientific Research Institute of Physics of Leningrad State University imeni A. A. Zhdanov)

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21(7) SOV/48-23-2-10/20

AUTHORS: Dzhelepov, V. S., Preobrazhenskiy, B. K., Sergiyenko, Y. A.

TITLE: Coincidences of Conversion Electrons in the Decay of Gd^{147} and Gd^{149} (Sovpadeniya mezhdu konversionnymi elektronami pri raspade Gd^{147} i Gd^{149})

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 2, pp 219-222 (USSR)

ABSTRACT: The spectra of conversion electrons of a Gd fraction were recorded by means of a two-lens spectrometer up to electron energies of 350 kev (Fig 1). The results of investigation of the coincidence of conversion electrons produced in the decay of Gd^{147} and Gd^{149} are contained in a table and shown in figures 2 and 3. The scheme of $Gd^{147} \longrightarrow Eu^{147}$ decay was determined from the coincidences of the lines K(396+370) and LM(396+370) with the K line (229 kev) and the scheme of $Gd^{149} \longrightarrow Eu^{149}$ decay in Gd^{149} from the coincidences (K-149.8)(K-346) and (K-149.8)(LM-346) (Fig 1). The authors thank N. M. Anton'yeva and A. A. Bashilov for interest in the

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Coincidences of Conversion Electrons in the Decay of Gd^{147} and Gd^{149}

paper. A. Andriyanova and Kh. Nasyrova, Students of the Alma-Ata University, and V. Bunakov and I. Myznikov, Students of the LGU, assisted in the measurements. There are 3 figures, 1 table, and 5 references, 4 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo gos. universiteta im. A. A. Zhdanova
(Scientific Research Institute of Physics of Leningrad State University imeni A. A. Zhdanov)

21(8)

AUTHORS: Anton'yeva, I. M., Bashilov, A. A., Dzhelepov, B. S., Preobrazhenskiy, B. K.

SOV/56-36-1-5/62

TITLE: The Spectra of the Conversion Electrons of Gd^{146} and Eu^{146} (Spektry konversionnykh elektronov Gd^{146} i Eu^{146})

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 1, pp 28-31 (USSR)

ABSTRACT: When investigating the conversion electron spectra of the neutron-deficient Gd-isotopes produced in the Ta-fission by 660 Mev protons (Ref 1), the authors succeeded in finding an activity with the half-life 45 d (Ref 2). The investigations begun in these preliminary investigations are continued. Investigation of the conversion electron spectrum of the Gd fraction was carried out by means of the magnetic spectrometer "Ketron" of Leningradskiy gosudarstvennyy universitet (Leningrad State University), which has a resolving power of 0.5 %. The activity of 45 days is escribed to Gd^{146} by Murin et al (Ref 3). The results obtained by the authors' investigations are shown by figure 1 (the conversion electron spectrum of Gd^{146}) and by the decay curve for Gd^{146} (Fig 2).

The Spectra of the Conversion Electrons of Gd^{146} and Eu^{146} SOV/56-36-1-5/62

The following lines were found: K-114.8, K-115.5, L-114.8 + + 115.5 + K-155, M-114.8 + 115.5, L-155, and M-155 kev. On the strength of these results a decay scheme (Fig 3) is suggested for Gd^{146} - Eu^{146} - Sm^{146}: The Gd^{146} goes over into Eu^{146} with a half-life of 45 days; the latter has three M1-transitions with E_γ = 155, 115.5, and 114.8 kev, and goes over into Sm^{146} with a half-life of 4.5 d. The latter with E_γ = 630 and 742 kev passes from the state (2^+) into the ground state. The results obtained by investigating the Eu^{146} conversion electron spectrum are shown by figure 4. In conclusion, the authors thank the director of the Laboratoriya yadernykh problem OIYaI (Laboratory for Nuclear Problems of the United Institute for Nuclear Research) V. P. Dzhelepov and the synchrocyclotron personnel for irradiating the tantalum samples. There are 4 figures and 6 Soviet references.

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The Spectra of the Conversion Electrons of Gd^{146} and Eu^{146} SOV/56-[illegible]/62

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: July 12, 1958

Card 3/3

24(5)
AUTHORS: Berlovich, E. Ye., Fleysher, V. G., Breslav, V. I., Preobrazhenskiy, B. K.

SOV/56-36-5-57/76

TITLE: The Quadrupole Moment of the Er^{168}-Nucleus
(Kvadrupol'nyy moment yadra Er^{168})

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 5, pp 1589-1590 (USSR)

ABSTRACT: The 80 kev level of Er^{168} formed in the K-capture in Tu^{168} has already been identified as the first level of the rotation band. Measurements of the lifetime of this level carried out by the authors also permit determination of the quadrupole moment and the deformation parameter of the Er^{168}-nucleus according to Bohr's formulas of the generalized nuclear model. The authors investigated the weak Tu^{168}-source which they obtained by constant irradiation of tantalum by 660 Mev protons on the synchrocyclotron of the Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research) by means of a device already described in an earlier paper (Ref 4). The coincidence

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curves obtained are shown by a figure; the two curves correspond to the coincidence of the X-rays accompanying K-capture and of the conversion electrons formed in transitions from the 80 kev level. For the half life of this level $(1.8\pm0.3).10^{-9}$sec is obtained. By considering the conversion on all shells (the values of the conversion coefficients are taken from references 5 and 6) $T_\gamma = (1 + \alpha)T_{exp} = (15\pm2.5).10^{-19}$sec is obtained for the radiation half-life ; α denotes the total conversion coefficient. The external quadrupole moment Q is found to amount to $Q = (7.6\pm0.6).10^{-24}cm^2$, and the deformation parameter: 0.32 ± 0.03. This value, which was determined from lifetime, agrees well with that determined from Coulomb excitation. There are 1 figure and 7 references, 4 of which are Soviet.

ASSOCIATION: Leningradskiy Fiziko-tekhnicheskiy institut Akademii nauk SSSR (Leningrad Physico-Technical Institute of the Academy of Sciences, USSR)

21(7)
AUTHORS: Kel'man, V. M., Metskhvarishvili, R.Ya., SOV/56-37-3-8/62
Preobrazhenskiy, B. K., Romanov, V. A., Tuchkevich, V. V.

TITLE: The Multipolarities of γ-Transitions in Tm^{169}

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 3(9), pp 639-642 (USSR)

ABSTRACT: The γ-spectrum and the spectrum of the conversion electrons of excited Tm^{169}-nuclei has already been investigated by several authors. In the present paper the level scheme of the considerably deformed Tm^{169}-nucleus and its particular characteristics are first discussed (Fig 1, Ref 4). In the following, the authors give several results obtained by measurements of the ratios of γ-conversion coefficients to the L-subshells of Tm^{169} (E_γ = 63, 94, 110, 130.5, 177, and 198 kev). Further, the multipolarities of the transitions were determined and for mixed radiations the percentage of the components was determined. The intensities of the conversion lines were measured by means of β-spectrometers. As a source a thin Yb^{169}-layer on an aluminum foil was used.

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The Multipolarities of γ-Transitions in Tm^{169} SOV/56-37-3-8/62

The production of this source is described in detail: A tantalum target was irradiated with 680 mev protons on the synchrocyclotron of the Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research); The rare-earth elements produced were separated by ion exchange (using the cationite KU-2) and subjected to a process of preparation which is described. Finally, a Lu-fraction (Lu^{169}) was obtained on the aluminum foil, which goes over into Yb^{169} with a half life of ~2d. Figure 2 shows the conversion lines of 177 kev γ-quanta onto the L-subshells of Tm^{169}, and figure 3 shows the same for 198 kev γ-quanta. In both cases also the L_{II}- and L_{III}-maxima are distinctly marked beside the steep L_I-peak. The results obtained by these investigations are shown in a table. Thus, the following was e.g. obtained for the 177 kev transition:
$L_I:L_{II}:L_{III} = 1 : (0.24\pm0.01) : (0.137\pm0.006)$; L_{II}/L_I : 82% M1 + + 18% E2, L_{III}/L_I : the same mixture.

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The Multipolarities of γ-Transitions in Tm^{169} SOV/56-37-3-8/62

For the 198 kev transition the following is given: $L_I:L_{II}:L_{III} = 1:(0.135\pm0.002):(0.063\pm0.001)$; L_{II}/L_I: 93% M1 + + 7% E2, L_{III}/L_I: 90% M1 + 10% E2. There are 3 figures, 1 table, and 15 references, 8 of which are Soviet.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut Akademii nauk SSSR (Leningrad Physico-technical Institute of the Academy of Sciences, USSR)

SUBMITTED: April 9, 1959

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PREOBRAZHENSKIY, B.K.

17

PHASE I BOOK EXPLOITATION SOV/5404

Murin, A. N., V. D. Nefedov, and V. P. Shvedov, eds.

Radiokhimiya i khimiya yadernykh protsessov (Radiochemistry and the Chemistry of Nuclear Processes) Leningrad, Goskhimizdat, 1960. 784 p. Errata slip inserted. 13,000 copies printed.

Ed.: F. Yu. Rachinskiy; Tech. Ed.: Ye. Ya. Erlikh.

PURPOSE : This textbook is intended for students of physical chemistry or radiochemistry at universities and schools of higher education. It may also serve as a handbook for scientific workers and technical personnel in the radiochemical industries and other related branches.

COVERAGE: The textbook deals with problems in modern radiochemistry, including adsorption, cocrystallization, isotope exchange in radioactive elements, the chemistry of nuclear processes, and methods of preparing radioactive isotopes and labeled compounds. Special attention has been given to chemical processes caused by radioactive transformations and radiation. In the main the book was compiled by person-

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nel of the Radiochemistry Department, Leningradskiy gosudarstvennyy universitet imeni A. A. Zhdanova (Leningrad State University imeni A. A. Zhdanov), and the Department of the Technology of Artificial Radioactive Isotopes, Leningradskiy tekhnologicheskiy institut imeni Lensoveta (Leningrad Technological Institute imeni Lensovet). No personalities are mentioned. References accompany individual chapters.

TABLE OF CONTENTS:

S/186/60/002/001/011/022
A057/A129

AUTHORS: Preobrazhenskiy, B.K.; Saykov, Yu.P.

TITLE: Ion-exchange separation of a group of elements. III. Elements of the copper group

PERIODICAL: Radiokhmiya, v. 2, no. 1, 1960, 68 - 72

TEXT: In continuation of previous studies ion-exchange separation of the elements Hg, Bi, Cd, Pb and Cu on sulfo-styrene cation exchange resin of the KY-2 (KU-2) type was investigated, using nitric acid or hydrochloric acid as elutriant. Under the given conditions the platinum metals are not absorbed from nitric acid solutions by the cation exchanger. Systematic investigations are important for the development of separation techniques for radioisotopes from complex mixtures, as well as for obtaining carrier-free isotopes. Separation of some of the metals of the copper group was already investigated by other authors: by Yu.Yu. Lur'ye and N.A. Filippova [Ref. 1: Zav. lab., 14, 159 (1948)], R. Klement and H. Sandmann [Ref. 2: Z. analyt. Chem., 145, 325 (1955)], K. Kraus and F. Nelson [Ref. 3: J. Am. Chem. Soc., 76, 5916 (1954)], D.I. Ryabchikov, V.Ye. Bukhtiyarov [Ref. 5: ZhAKh, 7, 377 (1952)], or chromatographic separation of platinum elements by

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S. Berman [Ref. 5: Canad. J. Chem., 36, 835, 845 (1958)], and D. Rees-Evans et al. [Ref. 6: Analyse, 83, 356 (1958)]. But the present paper reports first a separation method for the whole copper group. In order to obtain carrier-free elements in the present experiments no salt solutions were used for the washing-out process. Hydrochloric acid was used as complex-forming agent, because many of the corresponding stability constants were known. Cation exchange resin was used, because of the strong adsorbability of some of the chloride complexes (Hg, Bi) on anion exchange resins. The capacity of the used KU-2 cation exchange resin was 4.7 mg equiv/g, containing about 6% divinylbenzene. The H^+ form was used and a particle size of about 20μ. Column elution techniques were used with columns of 2 mm in diameter, 70 - 100 mm long and flow rate 1 drop/0.5 - 1 min. The column was washed out with 0.5 M HNO_3 solution (to remove Cl^- ions), and then 0.1 M HNO_3 containing the investigated elements was passed into the column. First the behavior of the single elements was investigated (see Table). It was observed that platinum elements are not adsorbed from 0.5 M HNO_3 and thus easily can be separated. Further separation in this group can be done by the methods reported in Reference 5 or 6. The elements adsorbed on the KU-2 exchanger are selectively washed out. The present authors give an example of separation of primarily separated elements from a complex mixture obtained by irradiation of bismuth with

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Ion-exchange separation of a group of elements....

protons (see Fig.). Similar practice can be applied to analytical purposes. With columns of about 10 cm long the maximum content of each element ensuring satisfactory separation is 10 mg/cm^2 of the column cross section. Removal of elements from the cation exchange resin occurs due to the selective formation of neutral and anion chloride complexes, which are not retained by the exchange resin. Thus S.A. Shchukarev et al. [Ref. 9: Uch. zap. LGU, 211, 17 (1957)] determined different stability constants of cadmium chloride complexes. Also formation of neutral complexes is important, especially at low chloride concentration, stimulating the removal of the element from the exchange resin. Copper is apparently removed by simple displacement with H-ions. This is in the present case an unpleasant side effect, which can be probably decreased by adding an organic solvent. In the present method this is not necessary because high hydrochloric acid concentrations are not needed. The investigated elements form also neutral and anionic complexes with HBr [Ref. 7: K.B. Yatsimirskiy, V.P. Vasil'yev, konstanty nestoykosti kompleksnykh soyedineniy (Instability Constants of Complexes), Izd. AN SSSR, M. (Ed. by AS USSR) (1959)], which are not retained by cation exchange resins. Thus probably HBr solutions can also be used for selective elution of these elements from cation exchange resin. There are: 1 figure, 1 table and 9 references: 5 Soviet-bloc and 4 non-Sviet-bloc.

SUBMITTED: May 25, 1959

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3/186/60/002/001/012/022
A057/A129

AUTHORS: Preobrazhenskiy, B.K.; Tsvelikhovskiy, V.P.; Mel'nikov, V.N.

TITLE: Ion-exchange separation of a group of elements. IV. Elements of the III. analytical group

PERIODICAL: Radiokhimiya, v. 2, no. 1, 1960, 73 - 77

TEXT: In the present paper a new method of ion-exchange separation for the elements of the third analytical group is described. It can be applied in radiochemistry (to the preparation of elements with or without carrier), or analytical chemistry. Many investigations were already made to separate some elements of this group, but if separation from a more complex mixture has to be carried out, none of these methods can be used without knowing the behavior of the other elements. In the present paper the following references are given: Ref. 1: D.I. Ryabchikov and V.Ye. Bukhtiyarov, ZhAKh, 9, 196 (1954); Ref. 4: I.P. Alimarin, Ye.P. Tsintsevich, Zav. lab., 21, 29 (1955); Ref. 6: A.K. Lavrukhina, DAN SSSR, 119, 56 (1958); Ref. 7: B. Lister, J. Chem. Soc., 3123 (1951); Ref. 8: E. Huffman, J. Am. Chem. Soc., 73, 4474 (1951); Ref. 12: O.V. A'tshuler et al., ZhNKh, 3, 1192 (1958); Ref. 13: T.A. Belyavskaya et al., ZhAKh, 13, 668 (1958);

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Ion-exchange separation of a group of elements. IV....

Ref. 15: D.I. Ryabchikov, and V.F. Osipova, ZhAKh, 11, 278 (1956). Developing the present method the authors considered two principles: 1) Selection of a special selective complex-forming agent for each element, and 2) selection of conditions for the separation with varying concentrations of a single complex-forming agent. In order to avoid hydrolysis of some of the investigated elements, only mineral acids were used as elutriants. Hydrochloric acid solutions were used to study chloride complexes. It was observed, however, that data given by K. Kraus and F. Nelson have to be checked. The present experiments were carried out with the KU-2 (KU-2) sulfo-styrene cation exchange resin (~6% divinylbenzene content, capacity 4.7 mg equiv/g) and the strongly basic AV-17 (AV-17) anion-exchange resin, or Dowex-1. The resins were used in H^+ or Cl^- form, and d = 2 mm, l = 70 - 100 mm columns were used. Flow rates of about 1 drop/min were maintained and the separation was controlled by means of radioactive isotopes or spot tests. Se details concerning the technique are described in previous papers [Ref. 18: ZhNKh, 3, 119 (1958); Ref. 19: ZhNKh, 2, 1164 (1957); Ref. 20: Radiokhimiya, 2, 1, 68 (1960)]. The first experiments demonstrated that the elements investigated cannot be separated using only one ion-exchange resin, but cation- and anion-exchange resins must be used. The following method was developed by the present authors: the concentrated hydrochloric acid solution containing the mixture of

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all the elements is passed through the column with the anion-exchange resin. The elements which form anionic complexes are adsorbed, and thus two sub-groups are separated. The elements adsorbed on the anion-exchange resin were removed selectively by varying the HCl concentration (corresponding to the constant of the anion complex). The elements which are not adsorbed by the anion-exchange resin were passed into the column with the cation-exchange resin and were then removed selectively. The conditions for the partition of the elements are presented in Figures 1, 2 and 3. If rare earths have not been removed preliminarily, they can be washed out quickly with 5 N HNO_3 after elution of aluminum and are separated by special methods (Refs. 18, 19). Fe and Ga are removed from the anion-exchange resin together and can be separated later on the cation-exchange resin according to the greater tendency of iron to form neutral complexes (like $FeCl_3$) or the less dissociated $HFeCl_4$ (compared to $HGeCl_4$). Ni^{2+} and Tl^{+} are removed almost together. Oxidizing the latter by saturating the elutriant with chlorine, Tl^{+} can be removed before Ni^{2+}. Thorium must be removed by sulfuric acid from the cation-exchange resin. Elements separated on the cation-exchange resin do not form anionic complexes in HCl solutions, even here separation occurs due to selective formation of mainly neutral complexes. Thus Ni and Tl can be removed from the cation-exchange resin with 1 M HCl solution, but not with 1 M HNO_3 solu-

tion, i.e., the anion of the acid is important, indicating that complex formation occurs. The adsorption of several elements on the cation-exchange resin stops already in 2.5 M HCl solution and they can be removed although they do not form anionic complexes. This indicates formation of neutral complexes, for instance of the type $[MeCl_x]^o$, for the elements Cr^{3+}, V^{4+}, Ni^{2+} and Tl^+. Cr^{3+} forms a stable neutral complex. Thus chromium can be easily separated from all other elements. This can be applied to serial analyses of metals, etc. The three references to recent English-language publications read as follows: Ref. 3: K. Kraus et al., J. Phys. Chem., 58, 11 (1954); Ref. 5: K.A. Kraus, G. Moore, J. Am. Chem. Soc., 75, 1460 (1953); Ref. 9: J. Benedict et al., J. Am. Chem. Soc., 76, 2036 (1954). There are 3 figures, 1 table and 19 references: 10 Soviet-bloc and 9 non-Soviet-bloc.

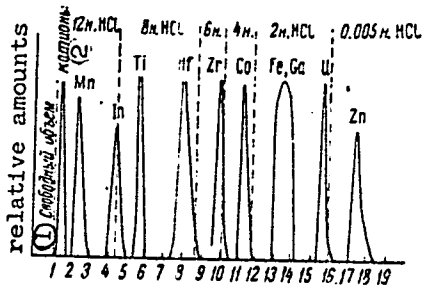

Figure 1: Separation of the elements of the III group, adsorbed by the anion-exchange resin from concentrated HCl (anion-exchange resin of AV-17 type or Dowex-1). ① free volume; ② cation.

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24397
S/186/60/002/002/016/022
E071/E433

52300

AUTHORS: Preobrazhenskiy, B.K., Kalyamin, A.V. and Lilova, O.M.

TITLE: On the problem of the influence of the size of the molecule of the complex forming agent and of the temperature on the ion exchange separation of radioactive rare earth elements

PERIODICAL: Radiokhimiya, 1960, Vol.2, No.2, pp.239-242

TEXT: For a successful ion exchange separation of elements, the knowledge of optimal conditions is necessary. For this purpose the authors carried out the determination of the coefficients of separation for rare earth elements with ammonium lactate and compared the results obtained with published data for ammonium oxyisobutyrate and glycolate. For comparison the determination of the coefficients of separation for the commercial resin Dowex-50-X12 was also made. In addition, the influence of temperature was studied. It was found that there is an optimum size of the molecule which gives the best selectivity of a complex formation with similar elements. Heavy rare earth elements can be separated better by ammonium lactate, and lighter elements by ammonium oxyisobutyrate. It was also shown that the temperature

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has an influence on the selectivity of the complex formation and coefficients of separation of the neighbouring elements. This is apparently related to changes in the dimensions of interacting ions. There are 2 tables and 6 references: 2 Soviet and 4 non-Soviet. The four references to English language publications read as follows:

G.Choppin, R.Silva, J.Inorg.Nucl.Chem., 3, 153 (1956);
L.Smith, D.Hoffman, J.Inorg.Nucl.Chem., 3, 243 (1956);
D.Steward. Proc.I. Geneva Conf. on the Peaceful uses of atomic energy P/729 (1955);
G.Choppin, B.Harvey, S.Thompson, J.Inorg.Nucl.Chem., 2, 66 (1956).

SUBMITTED: June 17, 1959

PREOBRAZHENSKIY, B.K.; KALYAMIN, A.V.; LILOVA, O.M.

Size of the molecules of the complex-forming agent and the temperature as factors in the ion-exchange separation of radioactive rare earth elements. Radiokhimiia 2 no.6:239-242 '60. (MIRA 14:4)

(Rare earths) (Ion exchange)

24093

S/186/60/002/006/018/026
A051/A129

5.2200 1043, 1067, 1273

AUTHORS: Lilova, O. M.; Preobrazhenskiy, B. K.

TITLE: Ion-exchange separation of elements
V. Elements of the alkaline group

PERIODICAL: Radiokhimiya, v. 2, no. 6, 1960, 728 - 730

TEXT: This is a continuation of the work in Ref. 12 (B. K. Preobrazhenskiy, V. I. Tsvelikhovskiy, V. N. Mel'nikov, Radiokhimiya, 2, 1, 73, 1960). The authors conducted a series of experiments to establish which resin groups possess the specific chemical bonds with certain elements accompanying the ion exchange of the usual type. It was shown that a succesful separation of alkaline elements can be carried out when using the phenol-formaldehyde sulfocationite of the KU-1 (KU-1) type. The conditions for the most favorable separation of the alkaline elements were also established. It was noted that a complex-formation of the alkaline elements with the phenol groups of the resin takes place, strongly increasing when transferring to the heavier elements and ensuring a particularly good separation of these: ($\alpha_{\frac{Cs}{Rb}} = 4.2$). This effect is expected to be particularly

Card 1/2

S/186/60/002/006/018/026
A051/A129

Ion-exchange separtion of elements ....

apparent for francium. The separation coefficients for the lighter elements are found to be less, but sufficient for succesful separation especially for indicator quantitites ($\alpha_{\frac{Na}{Li}} = 1.5$, $\alpha_{\frac{K}{Na}} = 1.8$, $\alpha_{\frac{Rb}{K}} = 1.6$). The effect of specific chemical bond formation is noted to a lesser extent when using PΦ(RF) phosphate cationite. It is pointed out that in recent times successful separations of the alkaline elements have been accomplished, when using the inorganic exchange agents in the form of heteropolyacids. There is 1 table, 1 figure and 12 references: 4 Soviet-bloc and 8 non-Soviet-bloc. The references to the English language publications read as follows: J. van R. Smit, Nature, 181, 1530, 1958; I. Fonarge, G. Duyckaerts, Anal. Chim. Acta, 14, 3, 527, 1956; K. Kraus, J. Am.Chem.Soc. 78, 3, 694, 1956; K. Kraus, Nature, 177, 1128, 1956.

SUBMITTED: January 5, 1960

Card 2/2

isotopes of the corresponding elements. On the basis of the results obtained, a scheme of separation of As, Se, Ge, Te, Sb, Sn, Mo, Re and Au is proposed. Fig.4 shows the separation of the sum of the elements of the As group in the column using the anion AV-17 or Daueks-1 activity in relative units vs. number of free volumes in the column. It is pointed out that some elements may be preliminarily separated by specific methods (e.g. arsenic, selenium and germanium distilled off in the medium of hydrogen bromide, or germanium alone from hydrochloric acid; antimony and tin sulphides are soluble in 6 N hydrochloric acid; a number of elements can be separated by specific extracting agents) thus simplifying the scheme. The behaviour of platinum and iridium on resins is unstable and they should be preliminarily separated. The proposed method is suitable for the separation of radioactive isotopes of the above elements and for general analytical purposes. There are 4 figures, 3 tables and 16 references: 6 Soviet-bloc and 10 non-Soviet-bloc. The four most recent references to English language publications read as follows: K.A.Kraus, D.C.Michelson, F.Nelson, J.Am.Chem.Soc., 81,13,3204 (1959); E.H.Huffman, R.L.Oswalt, L.A.Williams, J.Inorg.Nucl.Chem., 3,1,49 (1956);

Card 2/4

Ion-Exchange Separation ... S/186/61/003/003/010/018
E071/E435

K.A.Kraus, F.Nelson, J.Am.Chem.Soc.,77,17,4508 (1955);
V.W.Meloshe, A.F.Preuss, Anal.Chem., 26,12,1911 (1954).

SUBMITTED: May 31, 1960

Card 3/4

S/048/62/026/002/014/032
B106/B108

AUTHORS: Kalyamin, A. V., Murin, A. N., and Preobrazhenskiy, B. K.

TITLE: Products of deep fission processes Bi^{209} (p; xn, yp)

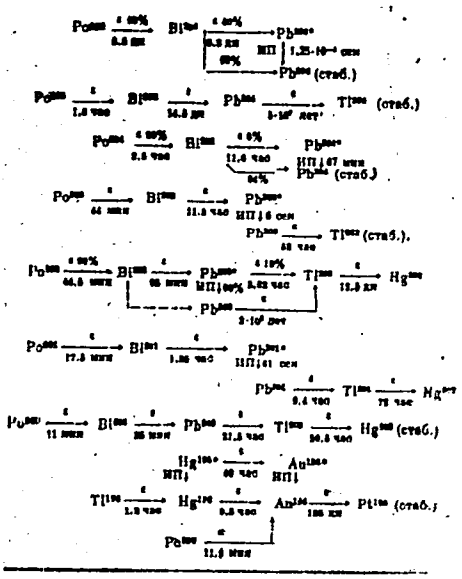
PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 2, 1962, 245-247

TEXT: The product yields were determined for the following radioactive decay processes:

Card 1/

S/048/62/026/002/014/032
B106/B108

Products of deep fission ...



Card 2/6

ДН denotes days, сек seconds, стаб stable, час hours, мин minutes, and лет years. All these reactions were initiated by bombarding Bi^{209} with 135-Mev protons yielding the mentioned polonium radioisotopes $Po^{200-208}$. The compositions of the resulting fractions (Bi, Pb, Tl, Au) were studied with a scintillation γ-spectrometer (NaI(Tl) crystal) with multichannel analyzer. The activities were measured in 4π geometry (CsI(Tl) crystal). The number of atoms of the individual radioisotopes was determined by decomposing the complex decay curve into the individual components. In addition to the yields in polonium isotopes, the individual and total yields of $Bi^{203, 204, 205, 206}$, Tl^{201} and Pb^{200} isotopes were determined. In all cases, the individual yield in Tl^{200} proved to be so small that it did not exert any considerable effect on the total yield in nuclei with mass number 200. The total yield in nuclei with mass number 195 as determined from the Au^{195} yield agreed as expected with the Po^{199} yield (as determined from its α-decay) within the limits of experimental error. The yield curve for the fission products was plotted from results (Fig.). In the chain of radioactive nuclei with the mass number 202, the problem of a possible

ε-capture on one of the Pb^{202} levels which lie below the isomeric level (Pb^{202*}) remained unsolved for the Bi^{202} isotope. If with Bi^{202} such an ε-capture on low Pb^{202} levels does not take place, the total yield in nuclei of the $Po^{202} \rightarrow Tl^{202}$ chain will be ten times the total yield in Tl^{202} (Fig.). The yield in Po^{202} is not less than the tenfold yield in Tl^{202}, i.e., not less than the total yield in nuclei of the chain. On the assumption that the chain yield is too low owing to the fact that the transitions $Bi^{202} \rightarrow Pb^{202}$ do not take place, the probabilities of the transformation $Bi^{202} \rightarrow Pb^{202}$ and $Bi^{202} \rightarrow Pb^{202*}$ would have a ratio of 5 : 1. The heads of the LYaP OIYaI are thanked for supplying working facilities on the synchrocyclotron, and I. A. Yutlandov and V. N. Pokrovskiy for assistance. There are 1 figure and 8 references: 6 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: Strominger D., Hollander J. M., Seaborg G. T., Rev. Mod. Phys. 30, no. 2, 585 (1958); Hunter E. T., Phys. Rev. 115 no. 4, 1053 (1959).

34173
S/048/62/026/002/014/032
B106/B108

Products of deep fission ...

ASSOCIATION: Radiyevyy institut im. V. G. Khlopina Akademii nauk SSSR (Radiuminstitute imeni V. G. Khlopin of the Academy of Sciences USSR)

SUBMITTED: September 23, 1961

Fig. Cross sections of the formation of fission products during fission of Bi^{209} by protons.
Legend: (I) E_p = 135 Mev; (II) E_p = 480 Mev (according to A. N. Murin, B. K. Preobrazhenskiy, N. Ye. Titov, Izv. AN SSSR. Ser. khimich., no. 4, 578 (1955)); (III) E_p = 660 Mev (according to A. V. Kalyamin, A. N. Murin, B. K. Preobrazhenskiy, N. Ye. Titov, Atomnaya energiya, 4, no. 2, 196 (1958)); (1) individual yields in polonium nuclei; (2) individual yields of bismuth nuclei; ordinate: σ, mb.

Card 5/6

BARANOVSKIY, V.I.; MURIN, A.N.; PREOBRAZHENSKIY, B.K.

Radiochemical study of the reactions of deep spallation and fission of tantalum by 680-MEV protons. Radiokhimia 4 no.4:470-479 '62. (MIRA 15:11)

(Tantalum--Isotopes)
(Nuclear fission) (Radiochemistry)

PREOBRAZHENSKIY, B.K.; LILOVA, O.M.

New hydrat isomers of chromic chloride $[Cr(H_2O)_3Cl_3].3H_2O$. Zhur.neorg. khim. 8 no.3:771-772 Mr '63. (MIRA 16:4)
(Chromium chlorides) (Hydrates)

L 5[illegible]63-65 EWT(m)/EPF(c)/EWG(m)/EWP(j)/EWP(t)/EWP(b) Pc-4/Pr-4 IJP(c)
RDW/JD/JG/GS/ET

ACCESSION NR: AT5013640 UR/0000/65/000/000/0085/0093
543.544.6:546.65

32
B+1

AUTHOR: Moskvin, L. N.; Preobrazhenskiy, B. K.

TITLE: Partition chromatography on polytetrafluoroethylene. Part 1. Separation of light rare earth elements by gradient elution

SOURCE: AN SSSR. Otdeleniye obshchey i tekhnicheskoy khimii. Radiokhimicheskiye metody opredeleniya mikroelementov (Radiochemical methods for determining trace elements); sbornik statey. Moscow, Izd-vo Nauka, 1965, 85-93

TOPIC TAGS: partition chromatography, polytetrafluoroethylene, rare earth analysis, gradient elution, light lanthanide separation, ethylhexylorthophosphate / Fluoroplast-4

ABSTRACT: The article is devoted to the development of a technique for separating light lanthanides by means of reversed phase partition chromatography on polytetrafluoroethylene. The latter was successfully used to stabilize the extracting agent, bis(2-ethylhexyl)-orthophosphoric acid (H2EHPA), in the form of a stationary organic phase in the chromatographic column. A procedure for purifying

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L 54463-65

ACCESSION NR: AT5013640

B2EHPA with ethylene glycol directly on the column to remove mono(2-ethylhexyl) orthophosphoric acid (M2EHPA) is described; it is convenient, yields good results, and may be used for the separation of these acids. The behavior of the elements studied was followed by means of the radioisotopes La^{140}, Ce^{144}, Pm^{147}, and $Eu^{152-154}$. A method proposed for calculating the concentrations of the eluent in the gradient elution of rare earths enables one to predetermine the position where the element will be obtained. When three consecutive mixing vessels are employed, there is good agreement between the calculated and observed positions of the elution peaks. Calculations and experiments showed that the use of one or two mixing vessels does not produce the desired results. Orig. art. has: 6 figures, 1 table, and 9 formulas.

ASSOCIATION: None

SUBMITTED: 24Jun63 ENCL: 00 SUB CODE: IC, GC

NO REF SOV: 002 OTHER: 003

Card 2/2

ACCESSION NR: AP4020062

S/0186/64/006/001/0128/0130

AUTHOR: Preobrazhenskiy, B. K.; Lilova, O. M.

TITLE: Some properties of sulfostyrene cation exchangers and their operation in a neutral and weak acid range

SOURCE: Radiokhimiya, v. 6, no. 1, 1964, 128-130

TOPIC TAGS: sulfostyrene, cation exchanger, sulfostyrene cation exchanger, resin, polymer chain, cation exchange resin, neutral acid range weak acid range

ABSTRACT: When resins are used in weak and neutral acid ranges, it is necessary to verify their quality and to consider the possible presence of weak acid groups capable of stable complexing with cations. These groups can develop owing to the gradual oxidation of the organic matrix of the resin and sometimes are present in resin as a result of synthesis. Resins should be kept in a dry state to prevent the oxidizing processes. During synthesis, reagents should be free from oxidized groups, and conditions which prevent oxidizing processes should be maintained. Synthesis conditions of resins should insure the uniform distribution of the cross combined state of polymer chains. Orig. art. has: 3 figures.

Card 1/2

ACCESSION NR: AP4020062

ASSOCIATION: None

SUBMITTED: 29Jul63 DATE ACQ: 31Mar64 ENCL: 00

SUB CODE: CH, PH NO REF SOV: 002 OTHER: 001

Card 2/2

MOSKVIN, L.N.; PREOBRAZHENSKIY, B.K.; RZHANITSYNA, L.N.

Use of ion exchange resins as aqueous phase carriers in partition chromatography. Separation of Zn, Cd, and Hg. Radiokhimiia 5 no.3:299-304 '63. (MIRA 16:10)

(Ion exchange resins)
(Chromatographic analysis)
(Metals--Analysis)

YEMEL'YANOV, D.S.; KHVAN, V.I.; PREOBRAZHENSKIY, B.P.

Automatic discharge of the heavy fractions form settling machines. Koks i khim. no.10:3-6 '63. (MIRA 16:11)

1. Khar'kovskiy institut gornogo mashinostroyeniya, avtomatiki i vychislitel'noy tekhniki.

PRECHISTENSKIY, B. S.

USSR/Medicine - Laryngology
Medicine - Otology

May 1947

"Impressions of the Berlin Oto-Laryngological Scientific-Conference and a Visit to a LOR-Clinic of the Soviet Zone of Germany," B. S. Preobrazhenskiy, 14 pp

"Vest Oto-rino-larin" No 3

A lengthy record of the oto-laryngological conference held in Berlin, 17 - 18 Dec 1946, in the interests of maintaining health among the Soviet Military Administration in Germany. Subjects discussed were the curing of chronic stenosis of the larynx and the trachea and the diagnosis and therapy of otosclerosis. Author mentions visiting LOR - Clinics at Berlin, Leipzig, Jena, Halle. Those at Rostock and Greifswald were not visited.

16751

Pr[illegible], B. S.

2[illegible]7

K problyeme izucheniya konstitutsii I naslyedstvyennosti v otorinol[illegible]
(Po materialam lektsiov na 2-y syezdii klinik. [illegible]-ogov. [illegible]. [illegible].
SSSR. Sverdlovsk, 29-30 noyabrya 19[illegible].)
Vyestnik otorinol ringologii, 19[illegible], No. 4, s. 9-14. Bibliogr: 15 nazv.

SO: LETOPIS' [illegible]. No

LIKHACHEV, A. G.; PREOBRAZHENSKIY, B. S.; TEMKIN, I. S.

Bolezni Ukha Nosa i Gorla (Diseases of Ear, Nose and Throat), 483 p., Medgiz, Moscow, 1950.

PREOBRAZHENSKIY, B.S.

Progress of Russian otolaryngology. Vest. otorinolar. no.5:3-19 Sept-Oct 1950. (CLML 20:1)

PREOBRAZHENSKIY, B.S.

Elimination of foreign words from Russian otorhinolaryngological terminology. Vest.otorinolar. 12 no.2:6-14 Mr-Ap '50.
(CLML 19:2)

PREOBRAZHENSKIY, B.S.

Results of local application of penicillin in diseases of the ear, larynx and nose. Uchen. zapiski vtor. moskov. med. Inst. Stalina Vol 2:97-101 1951.
(CIML 21:4)

1. Honored Worker in Science, Corresponding Member of the Academy of Medical Sciences USSR.

PREOBRAZHENSKIY, Boris Sergeyevich, prof.; STK...ANKIN, Iliodor Yefimovich, kand. med. nauk; LAGUTINA, Ye.V., red.

[How to protect yourself from angina and its sequelae] Kak uberech'sia ot anginy i ee posledstvii. M...skva, Izd-vo "Znanie," 1964. 22 p. (Narodnyi universitet: Fakul'tet zdorov'ia, no.9) (MIRA 17:6)

1. Deystvitel'nyy chlen AMN SSSR (for Preobrazhenskiy).

PREOBRAZHENSKIY, B S., Prof.

USSR (600)

Preobrazhenskii, Boris Sergeevich, 1892-

Edict of the Presidium of the Supreme Coucil of U.S.S.R. on awarding the order of Lenin to Professor B. S. Preobrazhenskiy. Vest. oto-rin. 14 no. 4, 1952.

Monthly List of Russian Accessions, Library of C ongress, November 1952. UNCLASSIIFED.

PREOBRAZHENSKIY, B.S.

Problems of the conduct of otolaryngologist and his relation to patients. Vest. otorinolar., Moskva 14 no. 4:5-13 July-Aug. 1952. (CIML 22:5)

1. Professor. 2. Moscow.

1. PREOBRAZHENSKIY, B. S., Prof.

2. USSR (600)

4. Otorhinolaryngology

7. Activities of the otorhinolaryngologist in a surgical center. Vest. oto-rin., 14 no.6, 1952.

9. Monthly List of Russian Accessions, Library of Congress, March 1953. Unclassified.
Same as Item 40530 in Current List of Med. Lit., Vol. XIII, [illegible]

PREOBRAZHENSKIY, B.S., professor.

Influenza morbidity in chronic inflammatory processes in the accessory sinuses of the nose. Vest.oto-rin. 15 no.4:6-9 Jl-Ag '53. (MLRA 6:9)

1. Klinika bolezney ukha, gorla i nosa II Moskovskogo meditsinskogo instituta im. I.V.Stalina. (Influenza) (Cold (Diseases))
(Nose, Accessory sinuses of--Diseases)

KALINA, V.O., kandidat meditsinskikh nauk; PREOBRAZHENSKIY, B.S., professor, deystvitel'nyy chlen Akademii meditsinskikh nauk SSSR, direktor.

Otogenous sinus thrombosis with symptoms of cerebral abscess. Vest.oto-rin. 15 no.4:29-33 Jl-Ag '53. (MLRA 6:9)

1. Klinika bolesney ukha, gorla i nosa II Moskovskogo meditsinskogo instituta im. I.V.Stalina. 2. Akademiya meditsinskikh nauk SSSR (for Preobrashenskiy). (Thrombosis) (Brain--Abscess)

PREOBRAZHENSKIY, B. S.

PREOBRAZHENSKIY, B.S.

[Tonsillitis, its prophylaxis and treatment] Anginy, ikh preduprezhdenie i lechenie. Moskva, Izd-vo "Znanie", 1954. 31. (Vsesoiuznoe obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii, Ser. 3, no.17) (MLRA 7:5)

1. Deystvitel'nyi chlen AMN SSSR.
(Tonsils--Diseases)